

1997 TRANSFER CASES**General Motors Corp. New Venture 233 Overhaul****IDENTIFICATION**

Transfer case can be identified by an I.D. tag, located on rear case. See **Fig. 1** . I.D. tag provides model number, assembly number and low range ratio. This information is necessary when ordering parts.

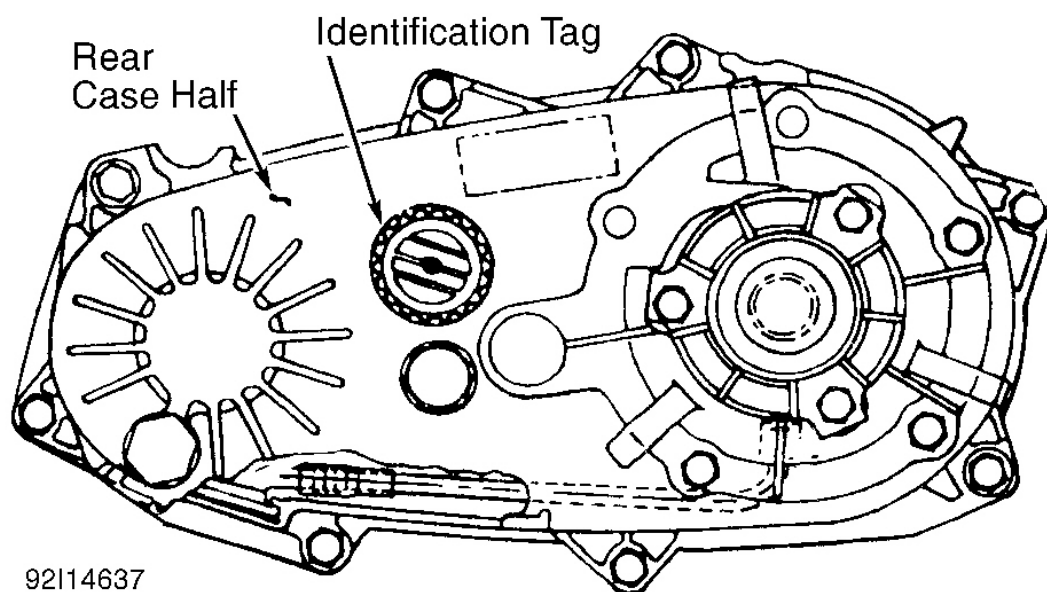


Fig. 1: Locating Identification Tag
Courtesy of GENERAL MOTORS CORP.

DESCRIPTION

Model 233 transfer case is a chain drive, 2-piece aluminum case, 3-position unit. Transfer case uses an electronic control system and a shift motor to shift the transfer case.

ADJUSTMENTS**GEARSHIFT LINKAGE**

Model 233 uses a electronic control system and shift motor for transfer case shifting and is not equipped with transfer case gearshift linkage.

ON-VEHICLE SERVICE

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FRONT OIL SEAL

Removal

Mark front drive shaft and flange for alignment purposes. Remove front drive shaft. Remove flange. Discard washer and nut. Using a screwdriver, carefully remove oil seal. Ensure seal contact surface is clean.

Installation

Apply ATF to seal lip and yoke seal surface. Install oil seal and yoke with NEW washer and nut. Install front drive shaft using alignment marks. Check transfer case fluid.

EXTENSION HOUSING OIL SEAL & BUSHING

Removal

Mark rear drive shaft and flange for installation purposes. Remove rear drive shaft. Tap extension housing clockwise and remove extension housing. DO NOT pry on extension housing. Using a screwdriver, remove oil seal from extension housing.

Installation

Using bushing driver, replace bushing in extension housing. Install NEW extension housing oil seal. Apply silicone sealant to extension housing mating surface. Install extension housing. To complete installation, reverse removal procedure.

TESTING

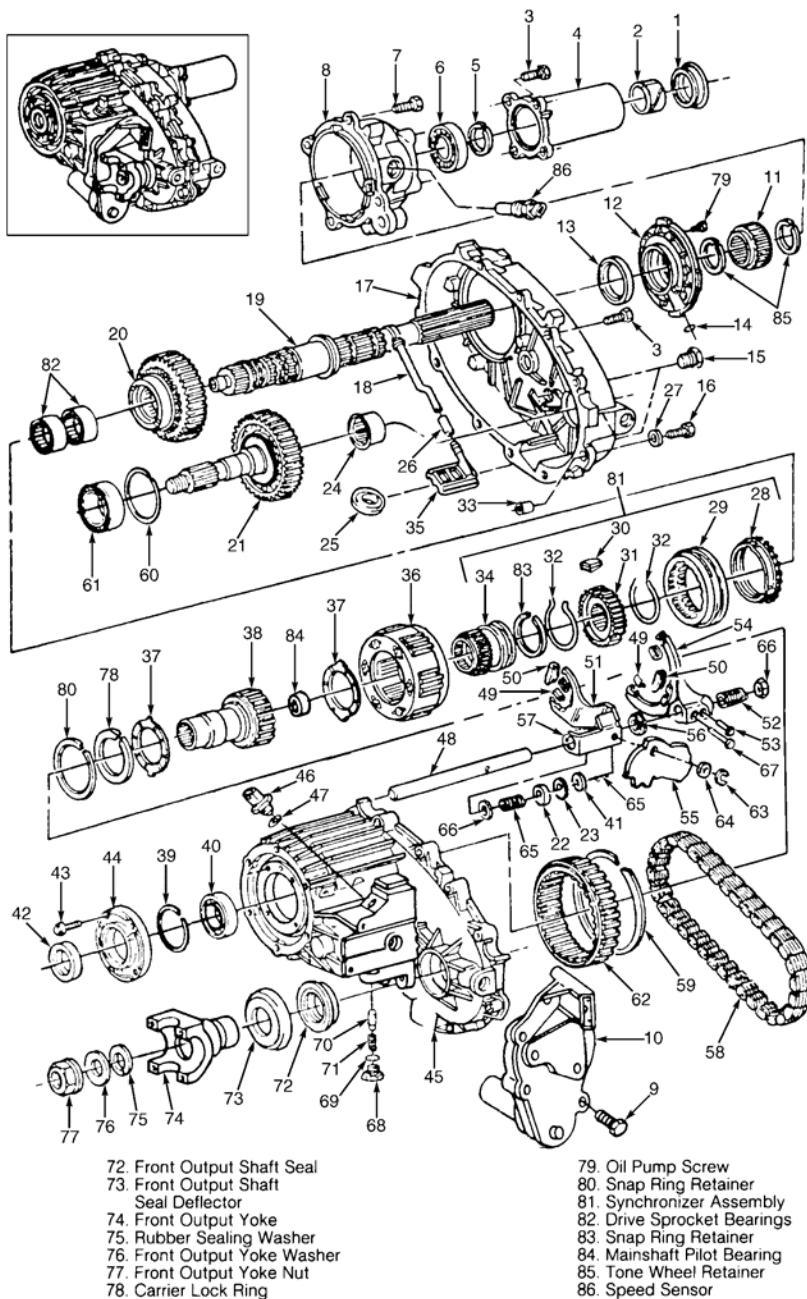
ELECTRONIC SYSTEM

For testing of electronic system and components, see **NV 233 DIAGNOSIS** article.

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1. Rear Output Shaft Seal
2. Extension Housing Bushing
3. Extension Housing Bolt
4. Extension Housing
5. Retainer
6. Rear Output Bearing
7. Pump Retainer Housing Bolt
8. Pump Retainer Housing
9. Encoder Motor Bolt
10. Encoder Motor
11. Speedometer Tone Wheel
12. Oil Pump
13. Oil Pump Seal
14. Pick-Up Tube "O" Ring Seal
15. Drain/Fill Plugs
16. Case Half Bolt
17. Rear Case Half
18. Oil Pick-Up Tube
19. Mainshaft
20. Drive Sprocket
21. Front Output Shaft
22. Shift Rail Spacer
23. Shift Rail Washer
24. Front Output Rear Bearing
25. Magnet
26. Coil Pick-Up Tube Connector
27. Washer
28. Synchronizer Ring
29. Synchronizer Sleeve
30. Synchronizer Insert
31. Synchronizer Hub
32. Synchronizer Insert Spring
33. Alignment Dowel
34. Range Shift Hub
35. Pump Pick-Up Screen
36. Planetary Carrier
37. Thrust Washer
38. Input Gear
39. Snap Ring
40. Input Bearing
41. Shift Rail Spring Washer
42. Input Bearing Retainer Seal
43. Input Bearing Retainer Bolt
44. Input Bearing Retainer
45. Front Case Half
46. Vacuum Switch
47. "O" Ring Seal
48. Shift Rail
49. Range & Mode Shift Fork Pad
50. Range & Mode Shift Fork Center Pad
51. Range Shift Fork
52. Mode Shift Fork Spring
53. Range Shift Fork Pin
54. Mode Shift Fork
55. Shift Sector
56. Shift Rail Bushing
57. Range Fork Bracket
58. Drive Chain
59. Snap Ring Retainer
60. Snap Ring Retainer
61. Front Output Bearing
62. Annulus Gear
63. Snap Ring Retainer
64. "O" Ring Seal
65. Shift Fork Spring
66. Shift Fork Spring Cup
67. Mode Fork Guide Pin
68. Detent Plug
69. "O" Ring Seal
70. Detent Pin
71. Detent Spring



72. Front Output Shaft Seal
73. Front Output Shaft Seal Deflector
74. Front Output Yoke
75. Rubber Sealing Washer
76. Front Output Yoke Washer
77. Front Output Yoke Nut
78. Carrier Lock Ring

79. Oil Pump Screw
80. Snap Ring Retainer
81. Synchronizer Assembly
82. Drive Sprocket Bearings
83. Snap Ring Retainer
84. Mainshaft Pilot Bearing
85. Tone Wheel Retainer
86. Speed Sensor

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Fig. 2: Exploded View Of Model 233 Transfer Case
Courtesy of GENERAL MOTORS CORP.

TROUBLE SHOOTING

SYMPTOM DIAGNOSIS

Will Not Shift Or Difficult To Shift

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Vehicle operated too long on dry paved surface. Stop vehicle. Place transmission in Reverse or Neutral to relieve drive line torque. Ensure correct fluid is used. Internal parts may be worn or damaged.

Noisy In All Gears

Check fluid level. Ensure correct fluid is used. If fluid is okay, locate possible internal mechanical problem.

Jumps Out Of Gear Or Noisy In 4WD

Transfer case internal shift mechanism faulty. Range fork damaged. Fork pads are worn. Shift fork binding. Low range gear worn.

Fluid Leaking From Vent Or Seals

Transfer case overfilled. Vent plugged. Output shaft seals are damaged or not installed properly.

REMOVAL & INSTALLATION

TRANSFER CASE

WARNING: When battery is disconnected, vehicles equipped with computers may lose memory data. When battery power is restored, driveability problems may exist on some vehicles. These vehicles may require a relearn procedure. See COMPUTER RELEARN PROCEDURES article in **GENERAL INFORMATION**.

Removal

1. Shift transfer case into 4H and disconnect battery negative cable. Raise vehicle, remove skid plate and drain fluid.
2. Mark front and rear output shaft yokes to drive shafts for reassembly reference. Support transfer case and remove rear crossmember. Remove drive shafts.
3. Disconnect speedometer cable, electrical connections and vacuum (hoses) harness at transfer case. Remove transfer case attaching bolts. Remove transfer case from vehicle.

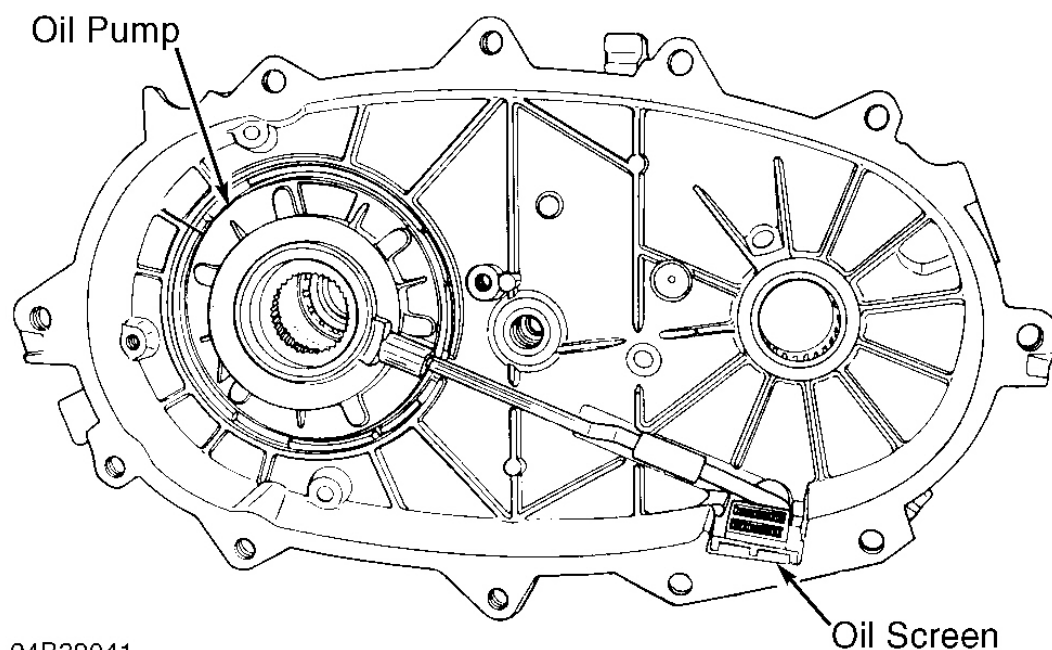
Installation

1. Clean all old gasket material from transmission and transfer case mating surfaces. Position NEW gasket on transfer case with orientation tab at upper left bolt hole.
2. Install transfer case, aligning splines of input shaft with transmission. Slide transfer case forward until seated against transmission. Install transfer case attaching bolts and tighten to specification. See **TORQUE SPECIFICATIONS** . Install rear crossmember.
3. Attach speedometer cable, electrical connections and vacuum harness at transfer case. Using reference marks made during removal, reinstall front and rear drive shafts. Refill transfer case. Install skid plate and lower vehicle. Connect negative battery cable. Road test vehicle.

TRANSFER CASE DISASSEMBLY

NOTE: See Fig. 2 for exploded view of transfer case.

1. Remove front output yoke. Discard lock nut. Remove shift motor, vacuum switch and speed sensor. Remove detent plug, spring and plunger from underside of case. Remove extension housing and rear output bearing retainer snap ring. Remove rear retainer housing bolts. Using 2 screwdrivers under each tab, remove pump retainer housing. Remove VSS rotor and snap ring from mainshaft. Remove case bolts (2 longer bolts go in doweled holes; mark all bolts for reinstallation position). Separate case halves by carefully prying only in molded slots. Remove oil pump assembly.
2. Remove pump pick-up tube, "O" ring and filter. See Fig. 3 . Remove mode shift fork spring (positioned in middle of drive chain). Remove front output shaft seal and snap ring.
3. Remove mainshaft, drive chain, and driven sprocket as an assembly (mode fork and shift rail will be removed with this assembly).
4. Remove synchronizer-to-mainshaft snap ring. Remove drive sprocket. Remove range shift fork and range shift hub as an assembly. Rotate sector shaft to obtain clearance for range fork. Remove shift sector shaft snap ring and sector shaft assembly.
5. Remove input bearing retainer bolts, then remove retainer. Remove input gear snap ring. Use soft-face hammer to remove input and low range gear assembly. Remove input gear to low range gear assembly snap ring. Separate input gear from low range gear assembly. Remove input bearing. Remove needle bearings from input gear.
6. Remove front output bearing snap ring. Remove front output bearing. Remove oil seal from mainshaft extension housing, then remove input bearing retainer seal. Remove front output rear bearing. Remove mainshaft bearing from oil pump retainer. Remove magnet from front case.
7. Mark and disassemble main drive synchronizer stop rings from sleeve. Remove spring retainers from synchronizer hub. Separate synchronizer hub from synchronizer. Remove oil pump screws from oil pump.



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Fig. 3: Removing & Installing Oil Pump Oil Screen
Courtesy of GENERAL MOTORS CORP.

CLEANING & INSPECTION

Clean all parts with solvent. Dry all parts with compressed air, except bearings. Bearings must be wiped dry or allowed to air dry. Replace all oil seals, "O" rings and snap rings. Check all parts for wear or damage. Replace all worn or damaged parts. If annulus gear, inside front case, is damaged or worn, front case and gear must be replaced as an assembly. Replace oil pump as an assembly if any part is damaged or worn.

TRANSFER CASE REASSEMBLY

NOTE: See Fig. 2 for exploded view of transfer case. When installing bearings, ensure bearing bores are aligned with oil feed holes.

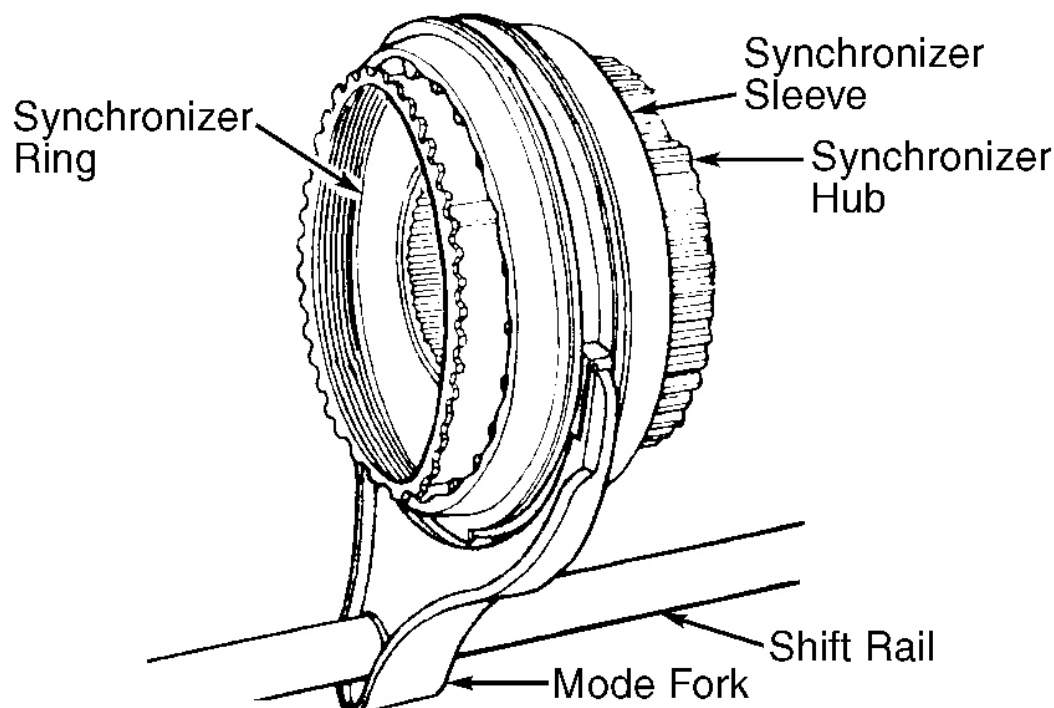
1. Lubricate all parts with Dexron-II ATF before installation. Install needle bearing into rear case half. Be sure bearing is flush with boss on case housing. Install front output shaft bearing with NEW snap ring. Install bearing into rear retainer housing.
2. Install input gear bearing. Install input gear assembly into planetary gear. Install input gear snap ring. Install input bearing. Install mainshaft extension housing seal. Lubricate seal lip with ATF fluid. Install input bearing seal into bearing retainer. Lubricate seal lip with ATF fluid.
3. Install magnet into front case half. Ensure synchronizer hub and sleeve mating marks are aligned, then install synchronizer hub to sleeve. Install hub spring retainers and stop rings. Install synchronizer drive

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sprocket. Install synchronizer assembly and snap ring.

4. Use soft-face hammer to install input and low range gear assembly. Install input gear snap ring. Install input bearing retainer. Apply RTV sealant to bearing retainer mating surfaces. Apply thread-lock to bolts, then install retainer bolts and tighten evenly.
5. Install shift sector assembly and snap ring. Install range shift hub and fork (rotate sector to align range shift fork). Install drive chain, mainshaft and driven sprocket assembly. Install fork shift spring.
6. Install oil pump pickup tube and screen into rear case (use care not to damage "O" ring). Install oil pump onto pickup tube. Apply RTV sealant to case mating surface. Install rear case to front case (use care to avoid damage to oil pump. Apply thread-lock to case bolts. Install case bolts and tighten evenly.
7. Install mainshaft snap ring. Install VSS rotor and snap ring. Install rear retainer housing. Apply RTV sealant to rear retainer housing-to-rear case joint. Install pump retainer housing bolts. Install output bearing snap ring.
8. Apply RTV sealant to extension housing mating surface and install housing. Apply thread-lock to extension housing bolts and install bolts. Install detent plug, spring and plunger to bottom of case. Install vehicle speed sensor with new "O" ring. Install vacuum switch with new "O" ring. Install electronic shift motor and bolts. Install front output shaft seal. Lubricate seal lip with ATF fluid. Install front output shaft snap ring. Fill transfer case with Dexron-II ATF.

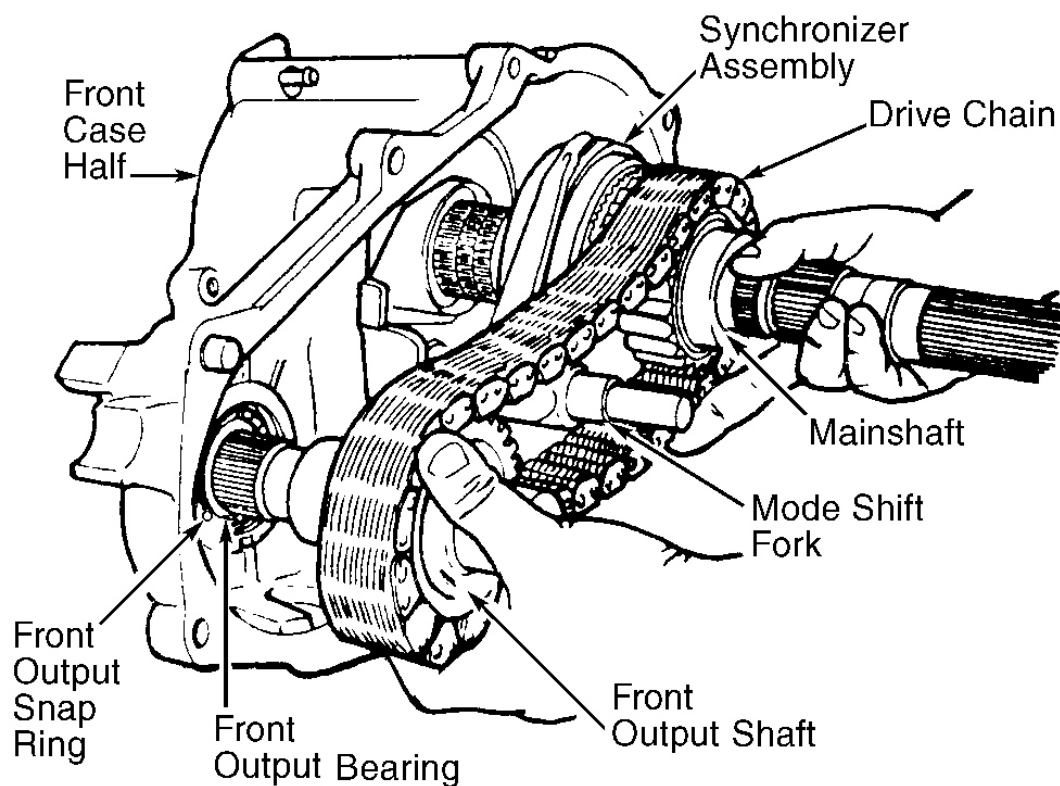


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Fig. 4: Identifying Synchronizer Assembly Components
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Fig. 5: Installing Output Shaft & Drive Chain Assembly
Courtesy of GENERAL MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Detent Plug	11 (15)
Drain & Fill Plug	35 (47)
Extension Housing Bolt	23 (31)
Front & Rear Bearing Retainer Bolt	14 (19)
Front Case-To-Rear Case Bolts	23 (31)
Oil Pump Housing Screw	23 (31)
Output Yoke Nut	110 (152)
Range Lever Nut	23 (31)
Shift Motor Bolt	13 (18)
Transfer Case-To-Transmission Nuts	41 (55)
Vehicle Speed Sensor	23 (31)